

# List of wood-boring beetles (Coleoptera: Bostrichidae, Curculionidae; Platypodinae, and Scolytinae) captured by bait branches set on the forest floor of a lower montane forest in northern Thailand

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タイ北部の低地山岳林において林床に設置した誘引枝で捕獲された穿孔虫類（甲虫目：  
ナガシクイムシ科、ゾウムシ科ナガキクイムシ亜科・キクイムシ亜科）のリスト

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ブラナパニッチパン サワイ<sup>\*3</sup>・ブラナパニッチパン アヌット<sup>\*3,6</sup>・  
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## Introduction

Bark and ambrosia beetles found in the subfamilies Platypodinae and Scolytinae of the Curculionidae family, as well as those of powder post beetles belonging to the family Bostrichidae, infest woody plants and processed wood, causing significant economic damage (Kangkamanee *et al.*, 2010; Sarikaya, 2013; Grégoire *et al.*, 2015). The subfamily Platypodinae comprises more than 1,400 species, grouped into 4 tribes and 29 genera (Jordal, 2015). Meanwhile, the subfamily Scolytinae consists of approximately 6,000 species, organized into 11 tribes and more than 247 genera (Kirkendall *et al.*, 2015). The family Bostrichidae includes more than 550 species across 9 subfamilies, 11 tribes, and over 90 genera (Borowski and Węgrzynowicz, 2007).

Sanguansub *et al.* (2020a, b) reported a list of these beetles captured using ethanol-baited traps set in a lower montane forest in northern Thailand. However, it has been suggested that ethanol attracted only a

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limited subset of these beetles flying in the area (e.g., Iidzuka *et al.*, 2016). Therefore, datasets obtained through alternative methodologies from the same locality during the same period are significantly valuable for enhancing our understanding of the biology of these beetles.

In this study, tree species were selected based on their phylogenetic distances from one another, and branches of the selected species were left in the understory of the forest, where ethanol-baited traps were deployed (Sanguansub *et al.*, 2020a). Beetles infesting the branches were collected by dissecting the branches after about a month of exposure to beetle attacks. The assemblage of wood-boring beetles (Coleoptera: Bostrichidae, Curculionidae; Platypodinae, and Scolytinae) infesting each tree species was assessed. This paper provides valuable data regarding the beetle assemblage, which will be useful for future comparisons of assemblages of the same group across a wide geographical range, as well as for comparisons with assemblages obtained through other methodologies in the same area, such as those reported by Sanguansub *et al.* (2020a).

## Materials and Methods

### Study site

The study site was located in a lowland montane forest with a top canopy height of 40 m, situated on the north-facing slope of Mt. Doi Pui in Doi Suthep-Pui National Park, approximately 10 km northwest of Chiang Mai City in northern Thailand. The most dominant plant family around the research site is the Fagaceae, which includes members of the genera *Castanopsis*, *Lithocarpus*, and *Quercus* (Marod and Duengkae, 2019). The research was carried out within the territory of the Khun Changkhian Highland Agricultural Research and Training Station (HARTS), Faculty of Agriculture, Chiang Mai University. The main crop cultivated at HARTS is coffee, grown in plantations established after canopy opening or thinning of the natural vegetation.

The climate is subtropical, characterized by a strong dry season (December–April) and a short rainy season (July–October). The average annual precipitation over 17 years (1997–2013) at the Kog Ma weather station (1,200 m a.s.l.), located about 4 km from HARTS, was 1,736 mm, with a peak in August (335 mm) (Glomvinya *et al.*, 2016). Annual mean temperature averaging 10-min temperature for the four years from 2013 to 2016 was 17.7°C, with a minimum of 12.0°C and a maximum of 23.1°C during the period (Sanguansub *et al.*, 2020b).

The study was conducted at four locations within HARTS (18.838° N–18.841° N, 98.897° E–98.900° E), with elevations ranging from 1,320 to 1,350 m a.s.l. (for details, see Sanguansub *et al.*, 2020a).

### Bait branch

Two rounds of experiments were conducted. In the first round, bait branches were set on March 14, May

28, August 6, and December 14, 2014. In the second round, bait branches were set on May 24 and September 15, 2015, as well as on January 16 and May 11, 2016. Table 1 presents the periods during which the bait branches were deployed.

Table 2 shows a list of tree species used for the experiment. Tree species were selected based on information regarding the species composition of woody plants in the surrounding area and a phylogenetic tree at the order level. In the first round, the species were chosen to encompass a broad phylogenetic range. In contrast, the focus in the second round shifted to interspecific comparisons within the families Fagaceae and Leguminosae.

One large branch from each target species, approximately 2.5 m in length, was cut with a handsaw (Figure 1(a)), tagged (Figure 1(b)), and transported to each of the four sites (Figure 1(c)), where it was deployed on the forest floor beneath the canopy to prevent desiccation (Figure 1(d)).

After about a month of exposure to beetle attacks, the bait branches were collected and transported to the Faculty of Agriculture, Chiang Mai University. Each branch was cut into small pieces measuring 5–10 cm in length, and the perimeter at the center of each piece was measured using a measuring tape before debarking (Figure 1(f)). Portions smaller than 6 cm in perimeter were classified as twigs. For portions larger than 6 cm in perimeter, holes created by beetles were marked with a waterproof pen after carefully scrutinizing the surfaces of the outer bark, inner bark, and sapwood. In the case of twig portions, insects were searched for without debarking (Figure 1(e)). Insects within the galleries were examined using different sizes of fishing lines, which were used to push out the insects after the bark and wood were dissected into small enough pieces to avoid overlooking the gallery (Figure 1(g)).

Insects obtained from each gallery were assigned a unique identification number and preserved in 95% ethanol in a single microcentrifuge tube. The information for each collection, including the collection date, host tree species, and the perimeter of the branch/twig from which each specimen was collected, was

Table 1 Dates of setting and retrieving bait branches at the Khun Changkhian Highland Agricultural Research and Training Station, Faculty of Agriculture, Chiang Mai University, Chiang Mai Province, northern Thailand, from 2014 to 2016.

	Setting	Retrieving	No. days exposed
First round	Mar 14, 2014	Apr 17, 2014	34
	May 28, 2014	Jun 30, 2014	33
	Aug 6, 2014	Sep 18, 2014	43
	Dec 14, 2014	Jan 8, 2015	25
Second round	May 24, 2015	Jul 5, 2015	42
	Sep 15, 2015	Nov 5, 2015	51
	Jan 16, 2016	Mar 7, 2016	51
	May 11, 2016	Jun 27, 2016	47

Table 2 Woody plant species with their order and family names used in two rounds of bait branch experiments at the Khun Changkhian Highland Agricultural Research and Training Station, Faculty of Agriculture, Chiang Mai University, Chiang Mai Province, northern Thailand, from 2014 to 2016.

Rount	Order	Family	Species	Abbreviation
First round				
	Gentianales	Apocynaceae	<i>Alstonia scholaris</i>	AS
	Laurales	Lauraceae	<i>Persea americana</i>	PA
	Geraniales	Meliaceae	<i>Azadirachta indica</i>	AI
	Quernales	Fagaceae	<i>Castanopsis acuminatissima</i>	CA
	Urticales	Moraceae	<i>Ficus benjamina</i>	FB
	Sapindales	Anacardiaceae	<i>Mangifera caloneura</i>	MC
	Personales	Bignoniaceae	<i>Millingtonia hortensis</i>	MH
	Euphorbiales	Euphorbiaceae	<i>Phyllanthus emblica</i>	PE
	Rosales	Leguminosae	<i>Pterocarpus macrocarpus</i>	PM
	Lamiales	Labiales	<i>Tectona grandis</i>	TG
	Myrtales	Combretaceae	<i>Terminalia catappa</i>	TC
Second round				
	Rosales	Leguminosae	<i>Bauhinia purpurea</i>	BP
	Rosales	Leguminosae	<i>Butea monosperma</i>	BM
	Rosales	Leguminosae	<i>Cassia fistula</i>	CF
	Rosales	Leguminosae	<i>Cassia siamea</i>	CS
	Quernales	Fagaceae	<i>Castanopsis acuminatissima</i>	CA
	Quernales	Fagaceae	<i>Castanopsis armata</i>	CAR
	Quernales	Fagaceae	<i>Castanopsis diversifolia</i>	CD
	Quernales	Fagaceae	<i>Lithocarpus elegans</i>	LE
	Quernales	Fagaceae	<i>Lithocarpus tenuinervis</i>	LT
	Quernales	Fagaceae	<i>Quercus kingiana</i>	QK

recorded separately for further analysis.

The insect samples were then transported back to the laboratory at the Kamphaeng Saen Campus of Kasetsart University for sorting into morphospecies. All species were identified by RAB, based on voucher specimens of each species.

## Results

During the two rounds of the study, a total of 15,392 galleries were examined. Among these, 7,476 galleries were identified as having been created by beetles belonging to the targeted groups. Of these, 3,944 galleries were recorded during the first round of the experiment, while the remaining 3,532 were noted in the second round. Specifically, the galleries attributed to the subfamilies Platypodinae, Scolytinae, and the family Bostrichidae were 53, 3,861, and 30 in the first year, and 212, 3,312, and 8 in the second year, respectively (Table 3).



Figure 1 Photos illustrating the setting and retrieval of bait branches, as well as the collection of beetles from these branches.

- (a) Collecting a branch from a large tree on the main campus of Chiang Mai University using a handsaw.
- (b) The collected branch tagged with a label indicating the plant species.
- (c) Collected branches with tags being transported to each of the four research sites.
- (d) Bait branches deployed on the forest floor beneath the canopy to expose them to beetle attacks.
- (e) Evidence of beetle attacks on a twig marked with a waterproof pen.
- (f) Branches cut into smaller pieces and their perimeters measured.
- (g) Bait branches transported to the Faculty of Agriculture, Chiang Mai University, and dissected to collect beetles inside.



Table 3 Summary of coleopteran species belonging to the family Bostrichidae and the subfamilies Scolytinae and Platypodinae of the family Curculionidae infested and captured from baited branches set on the forest floor from 2014 to 2016 at the Khun Changkhian Highland Agricultural Research and Training Station, Faculty of Agriculture, Chiang Mai University, Chiang Mai Province, northern Thailand.

Family	Subfamily	Tribe	Insect species	Total	1st round	2nd round
Curculionidae	Platypodinae	Platypodini	<i>Baiois pernamulus</i> (Schedl)	1	0	1
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus brevis</i> (Browne)	1	0	1
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus externedentatus</i> (Fairmaire)	2	2	0
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus</i> sp.	1	1	0
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus terminatus</i> Chapuis	113	37	76
Curculionidae	Platypodinae	Platypodini	<i>Euplatypus parallelus</i> (Fabricius)	4	2	2
Curculionidae	Platypodinae	Platypodini	<i>Peroplatypus laosi</i> (Schedl)	142	10	132
Curculionidae	Platypodinae	Platypodini	<i>Platypus quercivorus</i> (Murayama)	1	1	0
	Platypodinae	Subtotal		265	53	212
Curculionidae	Scolytinae	Corthylini	<i>Gnatharus tibetensis</i> Wood & Yin	1	0	1
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus dorsalis</i> (Motschulsky)	6	6	0
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus mangiferae</i> (Stebbing)	65	65	0
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus scabricollis</i> Eichhoff	13	13	0
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp.	1	1	0
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp. J	50	50	0
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes cyperi</i> (Beeson)	14	5	9
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes graniceps</i> (Eichhoff)	1	1	0
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes longior</i> (Eggers)	17	14	3
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes vulgaris</i> (Eggers)	2	1	1
Curculionidae	Scolytinae	Dryocoetini	<i>Dryocoetiops moestus</i> (Blandford)	3	3	0
Curculionidae	Scolytinae	Ernoporini	<i>Eidophelus</i> sp. TH1	47	15	32
Curculionidae	Scolytinae	Ernoporini	<i>Eidophelus</i> sp. TH5	2	0	2
Curculionidae	Scolytinae	Hyorrhynchini	<i>Suesu niisimai</i> (Eggers)	382	90	292
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus curvicaulosus</i> Gebhardt	1	1	0
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus minimus</i> Hagedorn	1,926	1,557	369
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus pubescens</i> Hagedorn	970	790	180
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus raja</i> Blandford	11	11	0
Curculionidae	Scolytinae	Tomicini	<i>Pseudoxylechinus</i> sp.n.	4	0	4
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus arecae</i> (Hornung)	1	1	0
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus aulmanni</i> (Hagedorn)	1	1	0
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus eruditus</i> cx Westwood	12	11	1
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus</i> sp.	3	1	2
Curculionidae	Scolytinae	Xyleborini	<i>Amasa resecta</i> (Eggers)	11	1	10
Curculionidae	Scolytinae	Xyleborini	<i>Amasa schlichii</i> (Stebbing)	1	0	1
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus asperatus</i> (Blandford)	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus lewisii</i> (Blandford)	6	2	4
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus minor</i> (Stebbing)	35	32	3
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus</i> sp.	8	7	1
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiophilus satoi</i> (Schedl)	33	1	32
Curculionidae	Scolytinae	Xyleborini	<i>Anisandrus hirtus</i> (Hagedorn)	24	12	12
Curculionidae	Scolytinae	Xyleborini	<i>Anisandrus ursulus</i> (Eggers)	7	7	0
Curculionidae	Scolytinae	Xyleborini	<i>Arixyleborus granifer</i> (Eichhoff)	26	1	25
Curculionidae	Scolytinae	Xyleborini	<i>Arixyleborus malayensis</i> Schedl	253	3	250
Curculionidae	Scolytinae	Xyleborini	<i>Beaverium magnus</i> (Niisima)	4	2	2
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus aterrimus</i> (Eggers)	171	167	4
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus bicornoides</i> (Schedl)	33	30	3
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus nitidipennis</i> (Schedl)	1	0	1
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus testudo</i> (Eggers)	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion bodoanum</i> (Reitter)	1	0	1
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion distinguendum</i> (Eggers)	218	26	192
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion perpilosellum</i> (Schedl)	255	0	255
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion petrosus</i> Smith, Beaver & Cognato	229	57	172
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion pilipenne</i> (Eggers)	498	24	474
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion</i> sp. C	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus corpulentus</i> (Eggers)	539	301	238
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus haberkorni</i> (Eggers)	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus justus</i> (Schedl)	22	9	13
Curculionidae	Scolytinae	Xyleborini	<i>Euwallacea andamanensis</i> (Blandford)	2	0	2
Curculionidae	Scolytinae	Xyleborini	<i>Euwallacea fornicatus</i> cx (Eichhoff)	31	27	4
Curculionidae	Scolytinae	Xyleborini	<i>Euwallacea interjectus</i> (Blandford)	2	1	1
Curculionidae	Scolytinae	Xyleborini	<i>Euwallacea minutus</i> (Blandford)	1	0	1

Table 3 (Continued)

Curculionidae	Scolytinae	Xyleborini	<i>Eurwallacea velatus</i> (Sampson)	52	29	23
Curculionidae	Scolytinae	Xyleborini	<i>Hadrodemius comans</i> (Sampson)	18	12	6
Curculionidae	Scolytinae	Xyleborini	<i>Hadrodemius pseudocomans</i> (Eggers)	23	17	6
Curculionidae	Scolytinae	Xyleborini	<i>Microperus alpha</i> (Beeson)	1	1	0
Curculionidae	Scolytinae	Xyleborini	<i>Microperus fulvulus</i> (Schedl)	1	1	0
Curculionidae	Scolytinae	Xyleborini	<i>Microperus parvulus</i> (Sampson)	33	9	24
Curculionidae	Scolytinae	Xyleborini	<i>Planiculic bicolor</i> (Blandford)	4	0	4
Curculionidae	Scolytinae	Xyleborini	<i>Truncaudum agnatum</i> (Eggers)	1	1	0
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborinus andrewesi</i> (Blandford)	31	3	28
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborinus subgranulatus</i> (Eggers)	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus</i> aff. <i>seriatus</i> Blandford	1	0	1
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus affinis</i> Eichhoff	2	1	1
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus perforans</i> (Wollaston)	6	6	0
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus</i> sp.	2	2	0
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus compactus</i> (Eichhoff)	49	2	47
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus crassiusculus</i> (Motschulsky)	203	110	93
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus erupteterminatus</i> (Schedl)	48	28	20
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus discolor</i> (Blandford)	91	49	42
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus eupatorii</i> (Eggers)	643	226	417
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus morigerus</i> (Blandford)	3	1	2
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus sub similis</i> (Eggers)	7	6	1
Scolytinae Subtotal				7,173	3,861	3,312
Curculionidae Subtotal				7,438	3,914	3,524
Bostrichidae	Dinoderinae		<i>Dinoderus brevis</i> Horn	1	0	1
Bostrichidae	Dinoderinae		<i>Dinoderus</i> sp.	4	2	2
Bostrichidae	Bostrichinae	Bostrichini	<i>Parabostrychus acuticollis</i> Lesne	2	2	0
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon anale</i> Lesne	2	0	2
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon unidentatum</i> (Fabricius)	4	3	1
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylocis tortilicornis</i> (Lesne)	4	2	2
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylopsocus acutespinosus</i> Lesne	20	20	0
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylothrips flavipes</i> (Illiger)	1	1	0
Bostrichidae Subtotal				38	30	8
Total of the three groups identified *				7,476	3,944	3,532
Other than the three groups				170	124	46
Unidentifiable specimens **				363	91	272
No. of empty galleries				7,383	4,723	2,660
No. of examined galleries				15,392	8,882	6,510

Notes: \* Family Bostrichidae and subfamilies Platypodinae and Scolytinae of the family Curculionidae

\*\* The category "Unidentifiable specimens" includes lost samples and those that cannot be identified due to damage or immaturity.

The abundance of each species on each tree species is presented in Tables 4 and 5.

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Family	Subfamily	Tribe	Insect species	Total	TC	FB	MC	AS	AI	CA	PE	TG	MH	PA	PM
Curculionidae	Platypodinae	Platypodini	<i>Baiois pernamulus</i> (Schedl)	0											
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus brevis</i> (Browne)	0											
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus externedentatus</i> (Fairmaire)	2		1				1					
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus</i> sp.	1			1								
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus terminatus</i> Chapuis	37	2		8			4	18	1		2	2
Curculionidae	Platypodinae	Platypodini	<i>Euplatypus parallelus</i> (Fabricius)	2			1			1					
Curculionidae	Platypodinae	Platypodini	<i>Peroplatypus laosi</i> (Schedl)	10						10					
Curculionidae	Platypodinae	Platypodini	<i>Platypus quercivorus</i> (Murrayama)	1						1					
	Platypodinae	Subtotal		53	2	1	10	0	0	17	18	1	0	2	2
Curculionidae	Scolytinae	Corthylini	<i>Gnatharus ibetensis</i> Wood & Yin	0											
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus dorsalis</i> (Motschulsky)	6		4	2								
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus mangiferae</i> (Stebbing)	65		2	63								
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus scabricollis</i> Eichhoff	13		8	4							1	
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp.	1		1									
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp. J	50		49				1					
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes cyperi</i> (Beeson)	5			1							2	2
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes graniceps</i> (Eichhoff)	1										1	
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes longior</i> (Eggers)	14		6	4			1	1			2	
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes vulgaris</i> (Eggers)	1			1								
Curculionidae	Scolytinae	Dryocoetini	<i>Dryocoetopsis moestus</i> (Blandford)	3			2							1	
Curculionidae	Scolytinae	Ernoporini	<i>Eidophelus</i> sp. TH1	15		14					1				
Curculionidae	Scolytinae	Ernoporini	<i>Eidophelus</i> sp. TH5	0											
Curculionidae	Scolytinae	Hyorrhynchini	<i>Saenus nissimai</i> (Eggers)	90	7	18	5	4	2	38	7	3	1	4	1
Curculionidae	Scolytinae	Scolytotoplatypodini	<i>Scolytotoplatypus curvicollosus</i> Gebhardt	1										1	
Curculionidae	Scolytinae	Scolytotoplatypodini	<i>Scolytotoplatypus minimus</i> Hagedorn	1,557	2	584	90		118	1		3	2	753	4
Curculionidae	Scolytinae	Scolytotoplatypodini	<i>Scolytotoplatypus pubescens</i> Hagedorn	790	49	116	224	18	86	27	3	5	33	202	27
Curculionidae	Scolytinae	Scolytotoplatypodini	<i>Scolytotoplatypus raja</i> Blandford	11		11									
Curculionidae	Scolytinae	Tomicini	<i>Pseudoxylechimus</i> sp.n.	0											
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus arecae</i> (Hornung)	1		1									
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus aulmanni</i> (Hagedorn)	1				1							
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus eruditus</i> ex Westwood	11		7			4						
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus</i> sp.	1					1						
Curculionidae	Scolytinae	Xyleborini	<i>Amasa resecta</i> (Eggers)	1	1										
Curculionidae	Scolytinae	Xyleborini	<i>Amasa schlichii</i> (Stebbing)	0											
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus asperatus</i> (Blandford)	2		2									
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus lewisi</i> (Blandford)	2			2								
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus minor</i> (Stebbing)	32			8	2	3	17	1	1			



Table 4 (Continued)

	Scolytinae	Subtotal		3,861	117	956	598	157	321	263	46	40	67	1,214	82
	Curculionidae	Subtotal		3,914	119	957	608	157	321	280	64	41	67	1,216	84
Bostrichidae	Dinoderinae		<i>Dinoderus brevis</i> Horn	0											
Bostrichidae	Dinoderinae		<i>Dinoderus</i> sp.	2										2	
Bostrichidae	Bostrichinae	Bostrichini	<i>Parabostrychus acuticollis</i> Lesne	2							2				
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon anale</i> Lesne	0											
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon unidentatum</i> (Fabricius)	3	1		1					1			
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylocis tortilicornis</i> (Lesne)	2										2	
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylopsocus acutespinosus</i> Lesne	20		1					3			16	
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylothrips flavipes</i> (Illiger)	1										1	
	Bostrichidae	Subtotal		30	1	1	1	0	0	0	5	1	0	21	0
Total of the three groups identified *				3,944	120	958	609	157	321	280	69	42	67	1,237	84

Notes: \* Family Bostrichidae and subfamilies Platypodinae and Scolytinae of the family Curculionidae

Table 5 Abundance of Coleopteran species belonging to the family Bostrichidae and the subfamilies Scolytinae and Platypodinae of the family Curculionidae captured from each baited branch species deployed on the forest floor during the second round (2015-2016) at the Khun Changkhian Highland Agricultural Research and Training Station, Faculty of Agriculture, Chiang Mai University, Chiang Mai Province, northern Thailand.

Family	Subfamily	Tribe	Insect species	Total	CA	CD	LT	LE	QK	CAR	CS	BP	BM	CF
Curculionidae	Platypodinae	Platypodini	<i>Baioctis peruanulus</i> (Schedl)	1				1						
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus brevis</i> (Browne)	1	1									
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus externedentatus</i> (Fairmaire)	0										
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus</i> sp.	0										
Curculionidae	Platypodinae	Platypodini	<i>Crossotarsus terminatus</i> Chapuis	76	23	12	6	7	15	3	4	1	4	1
Curculionidae	Platypodinae	Platypodini	<i>Euplatypus parallelus</i> (Fabricius)	2	2									
Curculionidae	Platypodinae	Platypodini	<i>Peroplatypus laosi</i> (Schedl)	132	58	19	5	24	14	4	7			1
Curculionidae	Platypodinae	Platypodini	<i>Platypus quercivorus</i> (Murayama)	0										
	Platypodinae	Subtotal		212	84	31	11	32	29	7	11	1	4	2
Curculionidae	Scolytinae	Corthylini	<i>Gnathorus tibetensis</i> Wood & Yin	1					1					
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus dorsalis</i> (Motschulsky)	0										
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus mangiferae</i> (Stebbing)	0										
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus scabricollis</i> Eichhoff	0										
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp.	0										
Curculionidae	Scolytinae	Cryphalini	<i>Cryphalus</i> sp. J	0										
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes cyperi</i> (Beeson)	9		2	4							3
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes graniceps</i> (Eichhoff)	0										
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes longior</i> (Eggers)	3					1	1				1
Curculionidae	Scolytinae	Dryocoetini	<i>Coccotrypes vulgaris</i> (Eggers)	1	1									
Curculionidae	Scolytinae	Dryocoetini	<i>Dryocoetops moestus</i> (Blandford)	0										
Curculionidae	Scolytinae	Emoporini	<i>Eidophelus</i> sp. TH1	32	1	5				4	10	2	9	1
Curculionidae	Scolytinae	Emoporini	<i>Eidophelus</i> sp. TH5	2								1		1
Curculionidae	Scolytinae	Hyorrhynchini	<i>Sinus nisimai</i> (Eggers)	292		7	92	6	20	56	27	46	18	20
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus curvicolis</i> Gebhardt	0										
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus minimus</i> Hagedorn	369	18						57	294		
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus pubescens</i> Hagedorn	180	2	2	37	8		4	81	43	2	1
Curculionidae	Scolytinae	Scolytoplatypodini	<i>Scolytoplatypus raja</i> Blandford	0										
Curculionidae	Scolytinae	Tomcini	<i>Pseudoxylechinus</i> sp.n.	4									2	2
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus arecae</i> (Hornung)	0										
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus aulmanni</i> (Hagedorn)	0										
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus eruditus</i> ex Westwood	1			1							
Curculionidae	Scolytinae	Trypophloeini	<i>Hypothenemus</i> sp.	2			2							
Curculionidae	Scolytinae	Xyleborini	<i>Amasa resecta</i> (Eggers)	10	4	2	3				1			
Curculionidae	Scolytinae	Xyleborini	<i>Amasa schlichtii</i> (Stebbing)	1		1								
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus asperatus</i> (Blandford)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus lewisi</i> (Blandford)	4	1		2				1			
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus minor</i> (Stebbing)	3	1		1					1		
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiodmus</i> sp.	1			1							
Curculionidae	Scolytinae	Xyleborini	<i>Ambrosiophilus satoi</i> (Schedl)	32	9		17	2					4	
Curculionidae	Scolytinae	Xyleborini	<i>Anisandrus hirtus</i> (Hagedorn)	12	7		1				3		1	
Curculionidae	Scolytinae	Xyleborini	<i>Anisandrus ursulus</i> (Eggers)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Arizyleborus granifer</i> (Eichhoff)	25	24		1							
Curculionidae	Scolytinae	Xyleborini	<i>Arizyleborus malayensis</i> Schedl	250	156	6	79	4	4				1	
Curculionidae	Scolytinae	Xyleborini	<i>Beaverium magnus</i> (Nisima)	2							2			
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus aterrimus</i> (Eggers)	4		1					2			1
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus bicornoides</i> (Schedl)	3							1	2		
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus nitidipennis</i> (Schedl)	1							1			
Curculionidae	Scolytinae	Xyleborini	<i>Cnestus testudo</i> (Eggers)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion bodosum</i> (Reitter)	1	1									
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion distinguendum</i> (Eggers)	192	67	16	21	58	24	2	1		3	
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion peripilosellum</i> (Schedl)	255	14	36	23	68	113		1			
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion petrosus</i> Smith, Beaver & Cognato	172	42	24	26	45	32	3				
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion pilipenne</i> (Eggers)	474	89	49	20	130	183	2				1
Curculionidae	Scolytinae	Xyleborini	<i>Cyclorhipidion</i> sp. C	0										
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus corpulentus</i> (Eggers)	238	28		19	1			162	11	17	
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus haberkorni</i> (Eggers)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Diuncus justus</i> (Schedl)	13	2		7				3		1	
Curculionidae	Scolytinae	Xyleborini	<i>Eiwallacea andamanensis</i> (Blandford)	2	1		1							
Curculionidae	Scolytinae	Xyleborini	<i>Eiwallacea formicatus</i> ex (Eichhoff)	4							3	1		
Curculionidae	Scolytinae	Xyleborini	<i>Eiwallacea interjectus</i> (Blandford)	1				1						
Curculionidae	Scolytinae	Xyleborini	<i>Eiwallacea minutus</i> (Blandford)	1			1							
Curculionidae	Scolytinae	Xyleborini	<i>Eiwallacea velatus</i> (Sampson)	23		3	2	4		1	6	1	6	
Curculionidae	Scolytinae	Xyleborini	<i>Hadrodemius comans</i> (Sampson)	6	2						3	1		
Curculionidae	Scolytinae	Xyleborini	<i>Hadrodemius pseudocomans</i> (Eggers)	6	1		3			1			1	
Curculionidae	Scolytinae	Xyleborini	<i>Microperus alpha</i> (Beeson)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Microperus fulvulus</i> (Schedl)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Microperus perparvus</i> (Sampson)	24		1	20				3			
Curculionidae	Scolytinae	Xyleborini	<i>Planiculius bicolor</i> (Blandford)	4	1				1				1	
Curculionidae	Scolytinae	Xyleborini	<i>Tranacaudum agnatum</i> (Eggers)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborinus andrewesi</i> (Blandford)	28	16		7	1				2	2	
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborinus subgranulatus</i> (Eggers)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus</i> aff. <i>seriatus</i> Blandford	1			1							
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus affinis</i> Eichhoff	1							1			
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus perforans</i> (Wollaston)	0										
Curculionidae	Scolytinae	Xyleborini	<i>Xyleborus</i> sp.	0										
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus compactus</i> (Eichhoff)	47	1		1				3	37	5	
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus crassiusculus</i> (Motschulsky)	93	7	4	23	4	4	4	32	4	11	
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus derupiteterminatus</i> (Schedl)	20	3		3		1		10	1	2	
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus discolor</i> (Blandford)	42		3				6	26	3	4	
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus eupatorii</i> (Eggers)	417	47	12	90	15	20	35	85	20	71	22

Table 5 (Continued)

Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus morigerus</i> (Blandford)	2	2														
Curculionidae	Scolytinae	Xyleborini	<i>Xylosandrus subsimilis</i> (Eggers)	1	1														
	Scolytinae	Subtotal		3,312	549	171	512	347	404	119	526	470	161	53					
	Curculionidae	Subtotal		3,524	633	202	523	379	433	126	537	471	165	55					
Bostrichidae	Dinoderinae		<i>Dinoderus brevis</i> Horn	1			1												
Bostrichidae	Dinoderinae		<i>Dinoderus</i> sp.	2		1			1										
Bostrichidae	Bostrichinae	Bostrichini	<i>Parabostrychus acuticollis</i> Lesne	0															
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon anale</i> Lesne	2		1	1												
Bostrichidae	Bostrichinae	Sinoxylonini	<i>Sinoxylon unidentatum</i> (Fabricius)	1							1								
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylocis tortilicornis</i> (Lesne)	2								2							
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylopsocus acutespinosus</i> Lesne	0															
Bostrichidae	Bostrichinae	Xyloperthini	<i>Xylothrips flavipes</i> (Illiger)	0															
	Bostrichidae	Subtotal		8	0	2	2	0	1	0	3	0	0	0					
Total of the three groups identified *				3,532	633	204	525	379	434	126	540	471	165	55					

Notes: \* Family Bostrichidae and subfamilies Platypodinae and Scolytinae of the family Curculionidae

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